



George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812



Materials and Processes
Laboratory, EM01

Metals Engineering
Branch, EM30

EM30-WI-005

02/11/2005

ORGANIZATIONAL WORK INSTRUCTION

EM30

WELD DEVELOPMENT WORK PROCEDURES

Baseline

**RELEASE
AUTHORITY**

NAME

TITLE

ORG

DATE

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02/11/2005

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DOCUMENT HISTORY LOG

Revision	Date	Originator	Description
Baseline	02-11-2005	T. Vaughn	Document rebaselined due to reorganization of Departments and Laboratories at the Center

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1 SCOPE

- 1.1 **SCOPE:** This procedure covers guidelines for receiving and conducting weld development work in buildings 4705, 4707, and 4711 using various welding systems for the Materials and Processes Laboratory, Metals Engineering Branch's Metalics Processing Team within the scope defined by MPD 1280.1.
- 1.2 **PURPOSE:** The purpose of this document is to outline the basic work flow and procedures for weld development in buildings 4705, 4707, and 4711 for the Metals Engineering Branch's Metalics Processes Team.
- 1.3 **APPLICABILITY:** This document is applicable to the Materials and Processes Laboratory, Metals Engineering Branch, Metalics Processes Team, and support personnel who work on welding activities in buildings 4705, 4707, and 4711.

2 APPLICABLE DOCUMENTS

- 2.1 MPD 1280.1 Marshall Management Manual.
- 2.2 MPR 1410.1 Document and Data Control of Organizational Issuances.
- 2.3 MSFC-SPEC-504 Welding Aluminum Alloys.
- 2.4 MSFC-SPEC-560 The Fusion Welding of Steels, Corrosion and Heat Resistant Materials.
- 2.5 MSFC-SPEC-766 Fusion Welding Titanium and Titanium Alloys.
- 2.6 NASA-STD-5006
- 2.7 EM30-WI-0xx Processes Development Calibration And Verification Procedures
- 2.8 Applicable MSFC safety, instruction, and reference manuals.
- 2.9 Applicable OEM equipment manuals.

3 DEFINITIONS

- 3.1 **WELD ALLOWABLES DATA:** Test data provided on weld properties for use in the design of flight hardware.
- 3.2 **COTR:** Contracting Officer's Technical Representative. A person named in a contract who is authorized to perform certain functions on behalf of the contracting officer. Authorized COTR functions are limited to those specifically delegated in writing by the contracting officer.

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4 INSTRUCTIONS

- 4.1 **GENERAL:** All welding performed for the generation of weld allowables data shall be accomplished and documented in accordance with the requirements of each individual program.
- 4.2 **REQUESTS FOR WORK:** The Welding Work Request Form, found on the Organizational World Wide Web site, (<http://maptis.nasa.gov/em30/em30masterlist.html/>), must be completed and approved prior to the start of work.
- 4.2.1 The work request form shall be filled out by the requester and/or by Organizational personnel.
- 4.2.2 The request for work shall be approved by Branch/Team level management or their designee and assigned to appropriate personnel.
- 4.3 **ALLOWABLES DATA REQUIREMENTS:** Data requirements shall be established by the individual program requirements for each project, as defined in the applicable welding work request.
- 4.4 WORK ACCOMPLISHMENT:**
- 4.4.1 Personnel assigned to complete the requested work shall work out scheduling details and priorities with the program manager and/or COTR.
- 4.4.2 The welding work shall be performed in accordance with all applicable standards and specifications detailed in the work request. In lieu of welder certification to MIL-STD-1595, each welder shall become qualified upon successful completion of the first foot of development welds through radiography unless otherwise specified on the work order.
- 4.4.3 All completed welding work shall be inspected using all applicable standards and specifications detailed in the work request.
- 4.4.4 Quality data shall be recorded on the computerized Welding Data Sheet.
- 4.5 **DATA REVIEW, APPROVAL, AND REPORTING:** Reports, memos, and data shall be reviewed, approved, and reported to the customer in accordance with standard Organizational practices described in EM30-WI-002.
- 4.6 **QUALITY RECORD ARCHIVING:** All quality records produced in fulfillment of customer requirements described in the work request shall be stored in accordance with standard Organizational practices found in EM30-WI-002.

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- 4.7 **SAMPLE DISPOSITION:** All samples and/or non-consumable Customer supplied materials shall be returned to the Customer or stored in accordance with standard Organizational practices described in EM30-WI-002.
- 4.8 **WORK REQUEST CLOSE OUT:** Once all applicable work has been completed, data distributed, and quality records archived, the work request shall be closed out in accordance with standard Organizational practices described in EM30-WI-002.

5 NOTES

- 5.1 None.

6 SAFETY PRECAUTIONS AND WARNING NOTES

- 6.1 None.

7 APPENDICES, DATA, REPORTS, AND FORMS

- 7.1 Not Applicable.

8 QUALITY RECORDS

- 8.1 The following listing includes EM30 Quality Records that are collected and saved during weld development activities.
- 8.1.1 EM30 Welding Work Request Logbook.
 - 8.1.2 EM30 Welding Work Request Form.
 - 8.1.3 EM30 Welding Data Sheet.
 - 8.1.4 EM30 Branch Memoranda.
- 8.2 All schedules pertaining to EM30 Quality Record retention and disposition are compiled in the EM30 Quality Records Listing located on the master list of the EM30 Branch website (<http://maptis.nasa.gov/em30/em30masterlist.html>).

9 TOOLS, EQUIPMENT, AND MATERIALS

9.1 WELDING EQUIPMENT:

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- 9.1.1 Weld Station 1 - Hobart HAWCS II based welding system.
- 9.1.2 Weld Station 2 - Hobart HAWCS II based welding system.
- 9.1.3 Weld Station 3 - Hobart Taper Weld Programming system.
- 9.1.4 Weld Station 4 - Hobart HAWCS II and Nicholson Vertical Friction Stir Welding System.
- 9.1.5 Weld Station 5 - Nicholson Circumferential Friction Stir Welding System.
- 9.1.6 Weld Station 6 - K&T Friction Stir Welding System

9.2 TESTING ACCESSORIES:

- 9.2.1 Various data acquisition and weld measurement systems.

10 PERSONNEL TRAINING AND CERTIFICATION

- 10.1 Civil Service personnel operating welding equipment as of October 1, 1997 are officially qualified to operate the equipment.
- 10.2 New hires to MSFC or transfers to this facility from within MSFC shall be mentored in the safe operation of welding equipment by a qualified operator prior to independent operation of the equipment.
- 10.3 Welding operations will not be allowed until basic safety, maintenance, and operational readiness is achieved by the operator.

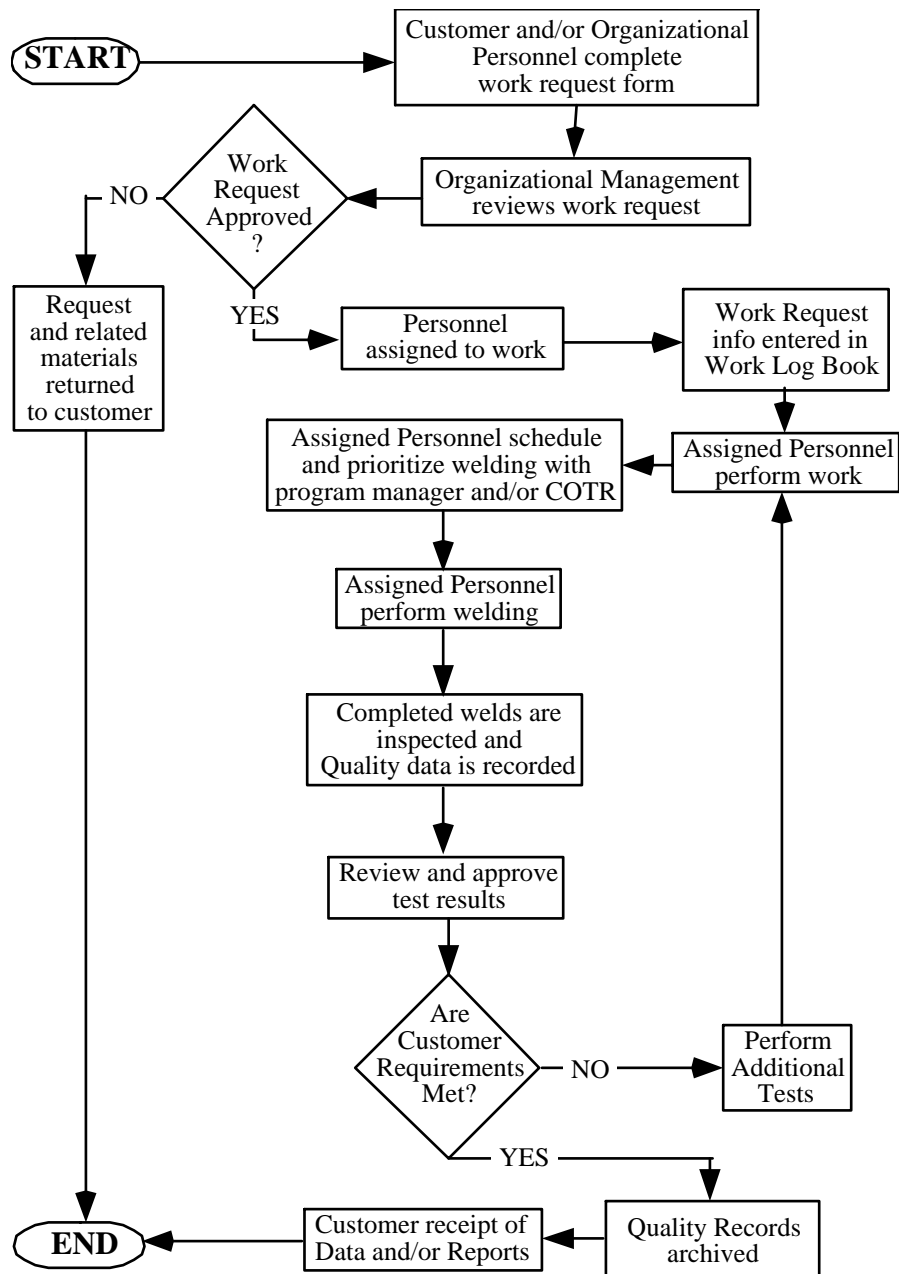
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11 FLOW DIAGRAM

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